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(54) Video signal transmission, recording and reproduction

Übertragung, Aufzeichnung und Wiedergabe eines Videosignals

Transmission, enregistrement et reproduction d'un signal vidéo

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Description

[0001] This invention relates to video signal transmission, recording and reproduction.

[0002] There has been proposed a VTR for consumer use in which program information in the form of a video signal and an associated audio signal are recorded in digital form on a magnetic tape. Digital recording of video signals and associated audio signals make it possible for such program information to be reproduced and copied (or "dubbed") onto another tape with little or no deterioration in the quality of the signal reproduced from the copy tape. There are times, however, when it is desirable to prevent such signals from being recorded. For example, in order to protect the rights of those holding a copyright in the recorded material, copyright protection schemes have been proposed in which the digital recording format includes a bit for indicating that copying of the recorded digital video signal is to be inhibited. Such proposed copy protection systems are designed to prevent unauthorized copying of a signal that is transmitted in digital form from one digital VTR to another, see here e.g. EP-A-0 224 929.

[0003] With respect to digital VTRs that can provide analog video and audio output and can receive analog video and audio signals as input signals, transmission of the video and audio signals in analog form from one digital VTR to another permits the receiving VTR to record a very high quality signal in digital form. The previously proposed copy protection systems for digital VTRs are not effective to prevent a digital VTR from recording a signal received in analog form, and the high quality of the resulting copies makes such copies a significant threat to the interests of those owning rights in the program information, such as copyright holders.

[0004] Moreover, there are a number of other sources of protectable program information in the form of video signals besides analog or digital video outputs from digital VTRs. Among these are television program signals broadcast from conventional terrestrial stations, television programs broadcast from satellites, video signals output from video disk players, television programming distributed by cable, and pay-per-view programming distributed by satellite or by cable. In some cases the broadcast signal may be free of any copyright but in other cases copyright is asserted. It is desirable that copying of the signals be prevented when a copyright is asserted with respect to the material represented by the signal or when the owner of such program information wishes to prevent unauthorized copying thereof.

[0005] This invention provides a method of digitally processing a video signal including a copy guard signal, the method comprising the steps of:

detecting the copy guard signal included in the video signal;
generating an ID signal from the detected copy guard signal;

inserting the ID signal into a vertical blanking period of the video signal to form a multiplexed video signal; and
outputting the multiplexed video signal.

[0006] This invention also provides apparatus for digitally processing a video signal including a copy guard signal, the apparatus comprising:

means for detecting the copy guard signal included in the video signal;
means for generating an ID signal from the detected copy guard signal;
means for inserting the ID signal into a vertical blanking period of the video signal to form a multiplexed video signal; and
means for outputting the multiplexed video signal.

[0007] Further respective aspects of the invention are set forth in the claims.

[0008] At least preferred embodiments of the invention provide copy protection of video signals received in analog form by a digital VTR from another digital VTR or from other sources of analog video signals.

[0009] The invention will now be described by way of example with reference to the accompanying drawings, throughout which like parts are referred to by like references, and in which:

Fig. 1 (Figs. 1A and 1B) is a block diagram of a reproducing section and a recording section of respective digital VTRs which are embodiments of the present invention;

Fig. 2 is a waveform diagram which shows the format of an ID signal generated in the VTR reproducing section illustrated in Fig. 1;

Fig. 3 is a schematic illustration showing additional details of the ID signal format of Fig. 2; and
Fig. 4 is a block diagram of a video system.

[0010] An embodiment of the present invention will now be described with reference to Fig. 1. Fig. 1 shows, in block form, a reproducing section 31 of a first digital VTR and a recording section 32 of a second digital VTR. In particular, Fig. 1 shows the portions of the reproducing section 31 needed for outputting analog signals, and the portions of recording section 32 needed for making a digital recording from analog input signals.

[0011] Reproducing section 31 includes an analog audio output terminal 11 and an analog video output terminal 12. Reproducing section 32 includes an analog audio input terminal 13 and an analog video input terminal 14. As shown in Fig. 1, the audio output terminal 11 of reproducing section 31 is connected to the audio input terminal 13 of recording section 32, and the video output terminal 12 of reproducing section 31 is connected to the video input terminal 14 of recording section 32.

[0012] Reproducing section 31 includes a magnetic

tape 1 on which a digital video signal has been recorded in compressed form. The compressed digital video signal is reproduced from magnetic tape 1 by a magnetic head 2 and the reproduced signal is supplied to a data reproduction circuit 3. The reproduced digital signal is provided through the data reproduction circuit 3 to both an audio reproduction circuit 4 and a data expanding circuit 5. The audio reproduction circuit 4 outputs an audio signal which is supplied to a D/A converter 9. The D/A converter 9, in turn, generates an analog audio signal provided for output at audio output terminal 11.

[0013] The reproduced signal provided to the data expanding circuit 5 is expanded therein to form an expanded digital video signal which is provided to an adding circuit 8. The reproduced signal output from data reproduction circuit 3 is also supplied to a copy guard bit detecting circuit 6. The copy guard bit detecting circuit 6 determines whether copying of the signal recorded on the tape 1 is permitted. This determination is made on the basis of the state of a copy guard bit that is included in the data as recorded on the tape 1. A signal representing the result of the determination is output from the copy guard bit detecting circuit 6 to an ID signal generating circuit 7. On the basis of the output signal from the copy guard bit detecting circuit 6, the ID signal generating circuit 7 generates an ID signal which will be described below. The ID signal generated by the ID signal generating circuit 7 is provided to the adding circuit 8, which combines the ID signal with the expanded digital video signal output from data expanding circuit 5 so that the ID signal is inserted into at least one horizontal interval of the vertical blanking interval of the expanded digital video signal. The resulting multiplexed digital video signal, which includes the ID signal, is provided from the adding circuit 8 to a D/A converter 10. D/A converter 10 converts the multiplexed digital video signal into an analog video signal, which is provided as an output signal at video output terminal 12.

[0014] The ID signal generated by ID signal generating circuit 7 will now be described in more detail with reference to Figs. 2 and 3. Fig. 2 shows a horizontal line signal from the vertical blanking interval of the multiplexed video signal output from video output terminal 12. For example, the illustrated line interval may be line 21 or line 283 of an odd or even field interval, although other line intervals may be used. The horizontal line signal shown in Fig. 2 includes a reference bit near the beginning of the line, followed by bits 1 through 20 which make up the ID signal.

[0015] Referring now to Fig. 3, the 20 bits making up the ID signal comprise a word 0 consisting of 6 bits, a word 1 consisting of 4 bits, a word 2 consisting of 4 bits, and a cyclic redundancy code (CRC) consisting of 6 bits. The bits making up word 0 contain fundamental parameter and identification information with respect to a transmission format for the video signal. One of the bits of word 1 indicates whether or not copy protection is asserted with respect to the recorded material (e.g. whether

the material is protected by copyright) and another bit included in word 1 indicates whether the recording is an original recording or a copy. For example, the third bit of word 1 may be the bit relating to copy protection, with the value "0" indicating that copying is to be prevented and value "1" indicating that copy protection is not asserted. Similarly, the fourth bit of word 1 may be used for indicating whether the recording is original. For example, if the fourth bit of word 1 has the value "0" this may signify that the material is "original" or proprietary, while the value "1" indicates that the material is commercially available.

[0016] The four bits of word 2 comprise a category code which identifies the type of device from which the video signal is being transmitted. In the present case, the category code would identify the type of device (consumer digital VTR) of which the reproducing section 31 is a part.

[0017] The 6-bit CRC following word 2 is a well-known type of error detection code and is used for detecting errors in the ID signal.

[0018] As will be seen, the ID signal can be used to determine whether or not to inhibit copying, with operation of a recording apparatus to be controlled on the basis of the determination.

[0019] Referring again to Fig. 1, the analog audio signal from the output terminal 11 and the analog video signal from the output terminal 12 are respectively received at the audio input terminal 13 and the video input terminal 14 of recording section 32.

[0020] The analog audio signal received at audio input terminal 13 is provided to an A/D converter 15, which converts the analog audio signal into a digital audio signal. The digital audio signal formed by A/D converter 15 is supplied to an audio recording circuit 17, which outputs a digital audio recording signal through a switch 23 to an adding circuit 24. The analog video signal received, at video input terminal 14 is provided to an A/D converter 16, which converts the received analog video signal into a digital video signal. The digital video signal formed by A/D converter 16 is supplied through a scramble circuit 18 to a bit compression circuit 19. The bit compression circuit 19 compresses and encodes the digital video signal and the resulting compressed and encoded digital video signal is supplied to the adding circuit 24. The compressed and encoded digital video signal and the digital audio recording signal are combined at adding circuit 24 to form a synthesized signal, which is supplied to a data recording circuit 25. A data recording signal output from data recording circuit 25 is recorded on a magnetic tape 27 by means of a magnetic recording head 26.

[0021] The above-mentioned scramble circuit 18 is selectively connected to key generation circuit 21, by means of a switch 22, for receiving a key signal generated by the key generation circuit 21.

[0022] An ID detection circuit 20 is connected to receive the digital video signal formed by A/D converter

16 and is also connected to switches 22 and 23 for controlling the operating states thereof on the basis of an ID signal detected in the digital video signal by ID signal detection circuit 20. The ID signal detection circuit 20 determines on the basis of the detected ID signal whether or not copying of the input video and audio signals is permitted and controls the switches 22 and 23 depending on whether copying is permitted. The determination as to whether copying is permitted may be made, for example, according to rules such as the following: If the copy protection bit (bit 3) of word 1 has the value "1", then copying is permitted. If the value of that bit "0", then whether copying is permitted depends on the category code (word 2). E.g., if bit 3 of word 1 is "0", and the type of device which is the source of the input signal, as indicated by the category code, is a consumer-use digital VTR, then copying is prohibited, but if the source of the input signal is a professional-use digital VTR, then copying is still permitted, even if bit 3 of word 1 is "0".

[0023] Operation of recording section 32, for recording the received audio and video signals when copying thereof is permitted, and for inhibiting recording of the signals when copying is not permitted, will now be described.

[0024] Let it first be assumed that copying of the received signal is permitted. In this case, the ID signal detection circuit 20 detects an ID signal, having the format described above with respect to Figs. 2 and 3, in the digital video signal formed by A/D converter 16. The ID signal detection circuit 20 determines, from the copy protection bit (bit 3) of word 1, from the category code (word 2), and possibly also from the "original" bit of word 1, that copying of the received video and audio signals is permitted. On the basis of the determination (which for present purposes is assumed to indicate that copying is permitted), the ID signal detection circuit 20 causes switch 22 to be in an open position and causes switch 23 to be in a closed position.

[0025] Because switch 22 is open, no key signal is provided from the key generation circuit 21 to scramble circuit 18, and therefore the digital video signal formed by A/D converter 16 is provided in unscrambled form for bit compression by bit compression circuit 19. The resulting unscrambled, compressed digital video signal is then provided to adding circuit 24, which also receives the digital audio recording signal from audio recording circuit 17, because the switch 23 is in its closed position. The synthesized signal formed by adding circuit 24 is then provided for recording on magnetic tape 27 through data recording circuit 25 and magnetic head 26, as previously described. As a result, a copy of the audio and video input signals is formed on magnetic tape 27.

[0026] Next, let it be assumed that copying of the received video and audio signals is not permitted. As in the previous case, the ID signal detection circuit 20 detects the ID signal in the digital video signal formed by A/D converter 16, but this time ID signal detection circuit 20 determines from the ID signal that copying is not per-

mitted. Based on this determination, ID signal detection circuit 20 causes switch 22 to be closed and switch 23 to be opened.

[0027] Because switch 22 is closed, a key signal generated by key generation circuit 21 is provided to scramble circuit 18, which causes the digital video signal provided from A/D converter 16 to be scrambled before it is supplied to bit compression circuit 19. At the same time, the digital audio recording signal formed by audio recording circuit 17 is not supplied to the adding circuit 24 because switch 23 is in an open position. In other words, the audio signal is "muted".

[0028] As a result, a scrambled digital video signal is recorded on magnetic tape 27 by means of the data recording circuit 25 and the magnetic head 26, the scrambling of the digital video signal being such that a satisfactory video picture cannot be reproduced and displayed from the signal recorded on the magnetic tape 27. It will also be understood that no audio signal is recorded on the tape 27.

[0029] Thus, in the embodiment of the invention as just described, copying of both an analog video signal and an associated analog audio signal received by a digital VTR are selectively inhibited on the basis of an ID signal present in a vertical blanking interval of the received analog video signal.

[0030] According to alternative embodiments of the invention, only recording of the video signal, or only recording of the audio signal, may be inhibited when the ID signal indicates that copying is not permitted.

[0031] According to another alternative embodiment of the invention, both a reproducing section 31 and a recording section 32, as described above in connection with Fig. 1, are incorporated in a single digital VTR, with a single tape transport mechanism being shared by the reproducing section 31 and the recording section 32, the tapes 1 and 27 therefore being one and the same, and the respective output terminals 11 and 12 and input terminals 13 and 14 not being interconnected. According to this embodiment, the reproducing section 31 operates to output to further apparatus a multiplexed analog video signal having an ID signal inserted in the vertical blanking interval of the video signal as described in connection with Figs. 2 and 3. Also, the recording section 32 includes the ID signal detection circuit 20 and the other circuitry for inhibiting recording by this embodiment in accordance with an ID signal that is present in a multiplexed analog video signal that is received by this embodiment. It will be appreciated that this embodiment provides both ID signal generation and selective inhibition of recording, depending upon whether this embodiment is operating in a playback or recording mode. Accordingly, this embodiment is suitable for distribution to consumers as part of a copy protection system.

[0032] The present invention may also be embodied in a multiple-deck digital VTR incorporating all of the circuitry illustrated in Fig. 1, and with respective connections between analog audio input and output terminals

and analog video input and output terminals, so that dubbing can be performed within the multiple-deck VTR by simultaneously using two tape transport decks. In this embodiment, such dubbing operations will be inhibited if the ID signal formed in the reproducing section indicates that copying is not permitted.

[0033] Selective inhibition of copying by a digital VTR can also be carried out in a system in which a digital VTR receives input video signals from sources in addition to another digital VTR.

[0034] For example, Fig. 4 shows a video system that includes a digital VTR 50 which has at least the recording section 32 as shown in Fig. 1 and another digital VTR 53 which has at least the reproducing section 31 as shown in Fig. 1. VTRs 50 and 53 are connected so that VTR 53 is a source of analog video and audio signals for VTR 50. Moreover, VTR 50 is also connected to receive analog video and audio input from a conventional VHF/UHF tuning receiver 51, and from a video disk player 52. The video disk player 52 may include reproducing circuitry similar to the reproducing section 31 of Fig. 1, and including an ID signal generation circuit as described in connection with Figs. 1-3.

[0035] A pay-per-view and/or pre-paid subscription cable receiving system made up of a cable T.V. tuner 54 and a cable T.V. decoder 55 also is a source of analog video and audio input signals for VTR 50, as is a satellite broadcast receiving system made up of a satellite broadcasting tuner 56 and a decoder 57. The ID signal generation and multiplexing functions described with respect to reproducing section 31 of Fig. 1 are included in the decoders 55 and 57 so that copying of the signals provided by the decoders 55 and 57 to the VTR 50 can be selectively inhibited on the basis of the ID signals generated in decoders 55 and 57.

[0036] It will be appreciated that an ID signal according to the format shown in Figs. 2 and 3 may also be included in a multiplexed analog video signal broadcast from a terrestrial broadcasting station and received via tuner 51.

[0037] Therefore, in the embodiment of Fig. 4 selective inhibition of recording by VTR 50 of analog video signals supplied thereto from a variety of sources can be accomplished in accordance with ID signals present in the input video signals.

[0038] At least a preferred embodiment of the present invention provides a method and apparatus for preventing a digital VTR from recording video signals which are designated as copy protected signals, for preventing a digital VTR from recording video signals as to which copyright is asserted, for preventing a digital VTR from recording copy protected video signals which are received in analog form from a digital VTR or another source of video signals, and for preventing copying of video signals which are intended to be copy protected and more particularly is directed to prevention of unauthorized copying of video signals transmitted or received by a digital video tape recorder (VTR).

[0039] Having described specific preferred embodiments of the present invention with reference to the accompanying drawings, it is to be understood that the invention is not limited to those precise embodiments, and that various changes and modifications may be effected therein by one skilled in the art without departing from the scope of the invention as defined in the appended claims. For example, although reproducing section 31 and recording section 32 have been shown and described with D/A and A/D converters so that analog signals are transmitted and received, such D/A and A/D conversion may be omitted, and digital video signals having the ID signal in the vertical blanking interval may be transmitted and received directly.

Claims

1. A method of digitally processing a video signal including a copy guard signal, the method comprising the steps of:
 - detecting (6) the copy guard signal included in the video signal;
 - generating (7) an ID signal from the detected copy guard signal;
 - inserting (8) the ID signal into a vertical blanking period of the video signal to form a multiplexed video signal; and
 - outputting (10, 12) the multiplexed video signal.
2. A method according to claim 1, comprising the step of:
 - reproducing (2, 3) the video signal from a recording medium (1).
3. A method according to claim 2, in which the recording medium is a magnetic tape (1).
4. A method according to claim 2, in which the recording medium is an optical disk.
5. A method according to claim 2, in which the recording medium is a magneto-optical disk.
6. A method according to claim 1, comprising the step of receiving and decoding a cable television signal to provide the video signal.
7. A method according to claim 1, comprising the step of receiving and decoding a satellite broadcast television signal to provide the video signal.
8. A method according to claim 1, comprising the step of receiving an over-the-air broadcast television signal to provide the video signal.

9. A method according to any one of the preceding claims, in which the multiplexed video signal is a digital video signal, the method comprising the step of:

converting (10) the multiplexed video signal into an analog video signal having the ID signal in a vertical blanking interval of the analog video signal.

10. A method according to any one of claims 2 to 5, in which the reproduced video signal is a digital video signal, the method comprising the step of:

converting (10) the reproduced video signal into an analog video signal.

11. A method according to claim 10, in which the reproduced digital video signal is a compressed digital video signal, the method comprising the step of expanding (5) the compressed digital video signal.

12. A method according to any one of the preceding claims, in which the ID signal includes a copy protection bit for indicating whether the multiplexed digital video signal is to be protected from copying.

13. A method according to any one of the preceding claims, in which the ID signal includes category information for identifying a type of device from which the analog video signal is transmitted.

14. Apparatus for digitally processing a video signal including a copy guard signal, the apparatus comprising:

means for detecting (6) the copy guard signal included in the video signal;
means for generating (7) an ID signal from the detected copy guard signal;
means for inserting (8) the ID signal into a vertical blanking period of the video signal to form a multiplexed video signal; and
means for outputting (10, 12) the multiplexed video signal.

15. Apparatus according to claim 14, comprising:

means for reproducing (2, 3) the video signal from a recording medium (1).

16. Apparatus according to claim 15, in which the recording medium is a magnetic tape (1).

17. Apparatus according to claim 15, in which the recording medium is an optical disk.

18. Apparatus according to claim 15, in which the re-

cording medium is a magneto-optical disk.

19. Apparatus according to claim 14, comprising means for receiving and decoding a cable television signal to provide the video signal.

20. Apparatus according to claim 14, comprising means for receiving and decoding a satellite broadcast television signal to provide the video signal.

21. Apparatus according to claim 14, comprising means for receiving an over-the-air broadcast television signal to provide the video signal.

22. Apparatus according to any one of claims 14 to 21, in which the multiplexed video signal is a digital video signal, the apparatus comprising:

means for converting (10) the multiplexed video signal into an analog video signal having the ID signal in a vertical blanking interval of the analog video signal.

23. Apparatus according to any one of claims 15 to 18, in which the reproduced video signal is a digital video signal, the apparatus comprising:

means for converting (10) the reproduced video signal into an analog video signal.

24. Apparatus according to claim 23, in which the reproduced digital video signal is a compressed digital video signal, and further comprising means for expanding (5) the compressed digital video signal.

25. Apparatus according to any one of claims 15 to 24, in which the ID signal includes a copy protection bit for indicating whether the multiplexed digital video signal is to be protected from copying.

26. Apparatus according to any one of claims 15 to 25, in which the ID signal includes category information for identifying a type of device from which the analog video signal is transmitted.

Patentansprüche

1. Verfahren zum digitalen Verarbeiten eines ein Kopierschutzsignal enthaltenden Videosignals, bestehend aus den Schritten:

Detektieren (6) des in dem Videosignal enthaltenen Kopierschutzsignals,
Erzeugen (7) eines ID-Signals aus dem detektierten Kopierschutzsignal,
Einsetzen (8) des ID-Signals in eine Vertikalaustastperiode des Videosignals zur Bildung ei-

nes gemultiplexten Videosignals, und Ausgeben (10, 12) des gemultiplexten Videosignals.

2. Verfahren nach Anspruch 1, mit dem Schritt:
Wiedergeben (2, 3) des Videosignals von einem Aufzeichnungsmedium.
10
3. Verfahren nach Anspruch 2, wobei das Aufzeichnungsmedium ein Magnetband (1) ist.
10
4. Verfahren nach Anspruch 2, wobei das Aufzeichnungsmedium eine optische Platte ist.
15
5. Verfahren nach Anspruch 2, wobei das Aufzeichnungsmedium eine magneto-optische Platte ist.
15
6. Verfahren nach Anspruch 1, mit dem Schritt: Empfangen und Decodieren eines Kabelfernsehsignals zur Bildung des Videosignals.
20
7. Verfahren nach Anspruch 1, mit dem Schritt: Empfangen und Decodieren eines Satellitenrundfunkfernsehsignals zur Bildung des Videosignals.
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8. Verfahren nach Anspruch 1, mit dem Schritt: Empfangen eines drahtlos übertragenen Rundfunkfernsehsignals zur Bildung des Videosignals.
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9. Verfahren nach einem der vorhergehenden Ansprüche, wobei das gemultiplexte Videosignal ein digitales Videosignal ist und das Verfahren den Schritt aufweist:
Umwandeln (10) des gemultiplexten Videosignals in ein analoges Videosignal, bei welchem sich das ID-Signal in einem Vertikalaustastintervall des analogen Videosignals befindet.
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10. Verfahren nach einem der Ansprüche 2 bis 5, wobei das wiedergegebene Videosignal ein digitales Videosignal ist und das Verfahren den Schritt aufweist: Umwandeln (10) des wiedergegebenen Videosignals in ein analoges Videosignal.
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11. Verfahren nach Anspruch 10, wobei das wiedergegebene Videosignal ein komprimiertes digitales Videosignal ist und das Verfahren den Schritt aufweist: Expandieren (5) des komprimierten digitalen Videosignals.
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12. Verfahren nach einem der vorhergehenden Ansprüche, wobei das ID-Signal ein Kopierschutzbit aufweist, um anzuzeigen, ob das gemultiplexte digitale Videosignal gegen ein Kopieren zu schützen ist.
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13. Verfahren nach einem der vorhergehenden An-

sprüche, wobei das ID-Signal eine Kategorieinformation aufweist, um den Typ einer Einrichtung, von der das analoge Videosignal übertragen wird, zu identifizieren.

14. Gerät zur digitalen Verarbeitung eines ein Kopierschutzsignal enthaltenden Videosignals, bestehend aus
einer Einrichtung (6) zum Detektieren des in dem Videosignal enthaltenen Kopierschutzsignals,
einer Einrichtung (7) zum Erzeugen eines ID-Signals aus dem detektierten Kopierschutzsignal,
einer Einrichtung (8) zum Einsetzen des ID-Signals in eine Vertikalaustastperiode des Videosignals zur Bildung eines gemultiplexten Videosignals, und
und einer Einrichtung (10, 12) zum Ausgeben des gemultiplexten Videosignals.
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15. Gerät nach Anspruch 14, mit
einer Einrichtung (2, 3) zum Wiedergeben des Videosignals von einem Aufzeichnungsmedium.
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16. Gerät nach Anspruch 15, wobei das Aufzeichnungsmedium ein Magnetband (1) ist.
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17. Gerät nach Anspruch 15, wobei das Aufzeichnungsmedium eine optische Platte ist.
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18. Gerät nach Anspruch 15, wobei das Aufzeichnungsmedium eine magneto-optische Platte ist.
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19. Gerät nach Anspruch 14, mit einer Einrichtung zum Empfangen und Decodieren eines Kabelfernsehsignals zur Bildung des Videosignals.
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20. Gerät nach Anspruch 14, mit einer Einrichtung zum Empfangen und Decodieren eines Satellitenrundfunkfernsehsignals zur Bildung des Videosignals.
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21. Gerät nach Anspruch 14, mit einer Einrichtung zum Empfangen eines drahtlos übertragenen Rundfunkfernsehsignals zur Bildung des Videosignals.
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22. Gerät nach einem der Ansprüche 14 bis 21, wobei das gemultiplexte Videosignal ein digitales Videosignal ist und das Gerät aufweist:
eine Einrichtung zur Umwandlung (10) des gemultiplexten Videosignals in ein analoges Videosignal, bei welchem sich das ID-Signal in einem Vertikalaustastintervall des analogen Videosignals befindet.
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23. Gerät nach einem der Ansprüche 15 bis 18, wobei das wiedergegebene Videosignal ein digitales Videosignal ist und das Gerät aufweist:

eine Einrichtung zur Umwandlung (10) des wiedergegebenen Videosignal in ein analoges Videosignal.

24. Gerät nach Anspruch 23, wobei das wiedergegebene Videosignal ein komprimiertes digitales Videosignal ist und das Gerät eine Einrichtung zum Expandieren (5) des komprimierten digitalen Videosignals aufweist.

25. Gerät nach einem der Ansprüche 15 bis 24, wobei das ID-Signal ein Kopierschutzbit aufweist, um anzuzeigen, ob das gemultiplexte digitale Videosignal gegen ein Kopieren zu schützen ist.

26. Gerät nach einem der Ansprüche 15 bis 25, wobei das ID-Signal eine Kategorieinformation aufweist, um den Typ einer Einrichtung, von der das analoge Videosignal übertragen wird, zu identifizieren.

Revendications

1. Procédé pour traiter en numérique un signal vidéo incluant un signal de protection contre une duplication, le procédé comprenant les étapes de :

détection (6) du signal de protection contre une duplication inclus dans le signal vidéo ;
génération (7) d'un signal ID à partir du signal de protection contre une duplication détecté ;
insertion (8) du signal ID dans une période de suppression de trame du signal vidéo pour former un signal vidéo multiplexé ; et,
sortie (10, 12) du signal vidéo multiplexé.

2. Procédé selon la revendication 1, comprenant l'étape de :

reproduction (2, 3) du signal vidéo à partir d'un support d'enregistrement (1).

3. Procédé selon la revendication 2, dans lequel le support d'enregistrement est une bande magnétique (1).

4. Procédé selon la revendication 2, dans lequel le support d'enregistrement est un disque optique.

5. Procédé selon la revendication 2, dans lequel le support d'enregistrement est un disque magnéto-optique.

6. Procédé selon la revendication 1, comprenant l'étape de :

pe de réception et de décodage d'un signal de télévision par câble pour obtenir le signal vidéo.

7. Procédé selon la revendication 1, comprenant l'étape de réception et de décodage d'un signal de télévision à diffusion par satellite pour obtenir le signal vidéo.

8. Procédé selon la revendication 1, comprenant l'étape de réception d'un signal de télévision à radiodiffusion pour obtenir le signal vidéo.

9. Procédé selon l'une quelconque des revendications précédentes, dans lequel le signal vidéo multiplexé est un signal vidéo numérique, le procédé comprenant l'étape de :

conversion (10) du signal vidéo multiplexé en un signal vidéo analogique comportant le signal ID dans un intervalle de suppression de trame du signal vidéo analogique.

10. Procédé selon l'une quelconque des revendications 2 à 5, dans lequel le signal vidéo reproduit est un signal vidéo numérique, le procédé comprenant l'étape de :

conversion (10) du signal vidéo reproduit en un signal vidéo analogique.

11. Procédé selon la revendication 10, dans lequel le signal vidéo numérique reproduit est un signal vidéo numérique comprimé, le procédé comprenant l'étape de développement (5) du signal vidéo numérique comprimé.

12. Procédé selon l'une quelconque des revendications précédentes, dans lequel le signal ID comprend un bit de protection contre une duplication pour indiquer si le signal vidéo numérique multiplexé doit être protégé contre une duplication.

13. Procédé selon l'une quelconque des revendications précédentes, dans lequel le signal ID comprend des informations de catégorie pour identifier un type de dispositif par lequel le signal vidéo analogique est émis.

14. Dispositif pour traiter en numérique un signal vidéo incluant un signal de protection contre une duplication, le dispositif comprenant :

des moyens pour détecter (6) le signal de protection contre une duplication inclus dans le signal vidéo ;
des moyens pour engendrer (7) un signal ID à partir du signal de protection contre une duplication détecté ;

- des moyens pour insérer (8) le signal ID dans une période de suppression de trame du signal vidéo afin de former un signal vidéo multiplexé ; et, des moyens pour sortir (10, 12) le signal vidéo multiplexé.
15. Dispositif selon la revendication 14, comprenant :
- des moyens pour reproduire (2, 3) le signal vidéo à partir d'un support d'enregistrement (1).
16. Dispositif selon la revendication 15, dans lequel le support d'enregistrement est une bande magnétique (1).
17. Dispositif selon la revendication 15, dans lequel le support d'enregistrement est un disque optique.
18. Dispositif selon la revendication 15, dans lequel le support d'enregistrement est un disque magnéto-optique.
19. Dispositif selon la revendication 14, comprenant des moyens pour recevoir et décoder un signal de télévision par câble afin d'obtenir le signal vidéo.
20. Dispositif selon la revendication 14, comprenant des moyens pour recevoir et décoder un signal de télévision à diffusion par satellite afin d'obtenir le signal vidéo.
21. Dispositif selon la revendication 14, comprenant des moyens pour recevoir un signal de télévision à radiodiffusion afin d'obtenir le signal vidéo.
22. Dispositif selon l'une quelconque des revendications 14 à 21, dans lequel le signal vidéo multiplexé est un signal vidéo numérique, le dispositif comprenant :
- des moyens pour convertir (10) le signal vidéo multiplexé en un signal vidéo analogique comportant le signal ID dans un intervalle de suppression de trame du signal vidéo analogique.
23. Dispositif selon l'une quelconque des revendications 15 à 18, dans lequel le signal vidéo reproduit est un signal vidéo numérique, le dispositif comprenant : des moyens pour convertir (10) le signal vidéo reproduit en un signal vidéo analogique.
24. Dispositif selon la revendication 23, dans lequel le signal vidéo numérique reproduit est un signal vidéo numérique comprimé, et comprenant en outre des moyens pour développer (5) le signal vidéo numérique comprimé.
25. Dispositif selon l'une quelconque des revendications 15 à 24, dans lequel le signal ID inclut un bit de protection contre une duplication pour indiquer si le signal vidéo numérique multiplexé doit être protégé contre une duplication.
26. Dispositif selon l'une quelconque des revendications 15 à 25, dans lequel le signal ID inclut des informations de catégorie pour identifier un type de dispositif par lequel le signal vidéo analogique est émis.

Fig. 1
Fig. 1A
Fig. 1B

Fig. 1A

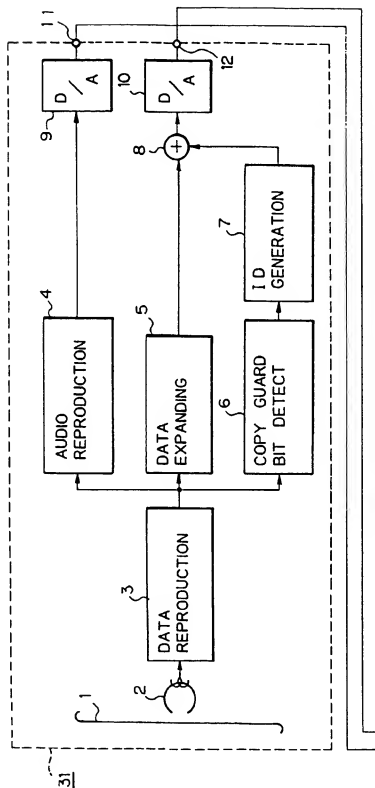


Fig. 1B

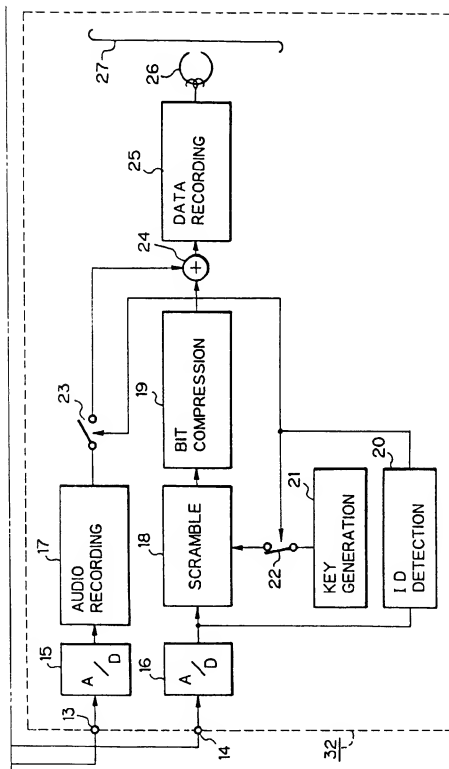


Fig. 2

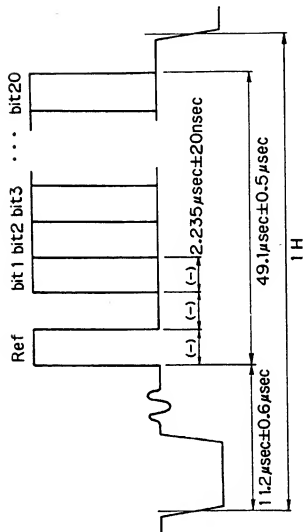


Fig. 3

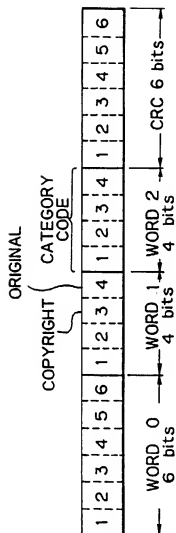


Fig. 4